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THE NATURE, QUANTITY AND QUALITY OF URBAN SEGMENTS

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Velimir Stojanović

Faculty of Technical Sciences, Kosovska Mitrovica, Serbia

Abstract. *The urban structure has no clearly visible boundaries between the content, function, form, and other, which is a consequence of the city's spatial development and a multitude of influences connected within this process. The city, however, has been created as a product of periodic construction and all possible interventions related to such a course of development. Plans, planning activities, projects, cycles, etc. have not eventually given a clear overview of the total urban structure and shown it as a clear and, to all of us, desirable whole. In order for such a structure to be understood, it was also necessary to review each individual situation where, due to the complexity, the city should be divided into appropriate parts and subparts, which can then be given different names (city element, part of the city, structural area, etc., but of all names, the concept and term 'segment' is most commonly used). In order to be analyzed, recognized and planned in the future, designed and built, the whole of the city must rely on such a division. The notion of an urban segment is related to the nature and number of elements of its content, and with such qualitative and quantitative nature, it becomes the basis for any further analysis. Analytical procedure of the segment also implies an additional analysis - of their mutual interactions or border areas. These areas are as significant as a segment, sometimes even more significant as they contain necessary information connecting the city into a whole.*

Key words: *urban structure, segment, influence, information, border area*

1. INTRODUCTION

Urban segmentation does not represent only simple physical division of the physical structure of the city. City, as a complex system of occurrence in space and time, has the need to present itself in a whole through its parts. However, city can never be represented as a unidentified whole, so its parts (segments) and their interactions cannot be represented that way

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Corresponding author: Velimir Stojanović

Faculty of Technical Sciences, Knjaza Milosa No. 7, 38220 Kosovska Mitrovica, Serbia

E-mail: velimir.stojanovic@pr.ac.rs

either. There was always a question of how to arrange the city (of any size) as a place where the cause has a clear consequence, and where any form of nonconformity could be avoided. This generally was not the case in practice. Theoreticians of architecture and urbanism (Habermas, 1984) through the history, tried to create the idealess conditions necessary for the creation of such cities. They represented a communicative action, which is practiced in cooperation with urban design and planning theory, assuming divergent communications networks that leads to common sense.

When the idea of a segment is accepted, it is conceived as a flexible category with a lot of internal content that change and whose primary task was connection of urban structure, systems and organization through all necessary levels, according to the spatial and temporal requirements. Thus, the scientific area of the architectural and urban organization of the space is directed and grounded in a fairly wide framework and according to specific directions that cover life and social needs in a multidisciplinary manner. This prevents architecture, and especially urbanism, from having an isolated status and acting from the position of technical and artistic service, to which the classical architecture and urbanism have become accustomed. From the very theory of space and form, through the composition and structure, until the analysis of typology, urban renewal and the necessity of searching for new building technologies, architecture and urbanism have expanded and entered in such spheres as the urban environment, observed from the economic and social point of view.

There are even more complex spheres of space-time-place (*genius loci-genius saeculi*), boundaries, transition elements, readability and picturesque structure observed from the psychological point of view, biogenic and biogenic pathogens spaces (healthy places), all until the theory of the needs of modern urban reconstruction and new aesthetic (design) and compositional principles. Such a wide range of urban issues requires a new definition of problems and goals, as well as the creation of original connections between hypothetical concepts in theory and achievements in practice. The architectural artifact thus ceases to be an "art exhibit of an open museum called the city" and turns into an interdependent element of a variable space in time, and a carrier of significant planned forms and their implementation. A group of such elements gives an urban segment.

The ultimate goal of observation, analysis, and interventions in such parts of the urban structure is the desire and the need for general observation of the city's structure. There is also a necessary need for perceiving the nature of mutual overlap, not only formal analyses of constructed content. It yields benefits for the city as a product but also the methods used in the process which diminish the mutual disagreement between architectural and urban elements giving us the possibility to achieve the necessary concord of the city parts in further construction. This is the basic idea, the driving motive, the goal and ultimately the belief in the idea that classical zoning theory could be replaced by a more natural observation of the constructed reality.

To be exact, that is the very goal of every urban segmentation research as well of this one. The creation of the necessary database for every segment and border areas, research and efforts in achieving this. The layout of moves is following - the urban structure is large. The process and segmentation process aim to defragment it into a smaller number of perceivable and usable parts. These parts connect and overlap. The diversity of the content of the urban structure forces us to measure, categorize, compile and apply the elements of the urban structure through analytical methods and criteria which we will establish. Why is this necessary? Any future participant of a new constructional, architectural and urban project

would want to have an idea of the content of space he is dealing with. Surely, the criteria, methods, and approaches cannot be predefined, because they depend on each selected and analysed structure and its properties in particular, even though the approach might be the same. That could be also called by design of a particular atlas of space at the time where the specific urban structure would be represented including all necessary data obtained by the criteria of analysis of the forms, shapes, functions, historical parameters etc. That is a valuable collection of knowledge available to the construction participant and many would like it to exist in one way or another rather than not at all. On the contrary, every intervention would have to be founded on scarce information or on what we alone must gather. That would be the frame and the sense of every work of this kind.

The goal of research would also be a process, the ability and the possibility of collecting and shaping such data and ways of their preservation and use. It is possible that such collecting and shaping is difficult to achieve which would make this a demanding level of research work. The goal of research would also be levelled in justification and the practicality of the obtained results, since all urban structures and therefore the segments, are not the same, and neither is working on them, which would be proven from example to example.

2. URBAN SEGMENTS AND THE CITY

The definition of the urban segment, however understood and accepted, would not be possible without the corresponding architectural and urban legislation and regulations, the relations of government, citizens, architects, urban planners, state and its institutions, especially in practice. Thus, the urban segment becomes a complex cell of the city structure, which contains and transmits variable contents through the, only seemingly, intricate hierarchy of the influence on other segments and the city as a whole. These influences can be both, positive and negative, faster or slower, with more or less content... They can be (and mostly they are) under different limitations and self-limitations, but they are in an inconsistent function and continuity. Even the slowest and most limited influence of the segment is the influence worth of attention and analysis. In one of his earlier works, the author of this paper (Stojanović, 2015b) has written about such behavior of the segment (segments) and the processes involved in, that the change in urban structure is not only a simple physical event in time and space, it already contains reasons and goals of spatial planning, spatial levels and time phases, various classifications and systematizations in the process of planning the urban community.

Creating and designing complex compositions of buildings in the environment requires identification, collection and use of number of different types of information and meanings, from material and physical elements, through economic and legal criteria, social contents, psychology and culture of urban life, to art and aesthetics. Prior to this, about the relation between legislative and legislation process those recognized and visible, also those unrecognizable and invisible (Stojanović, 2015a) was noticed that urban legislation, in the worst forms, continually creates the consequences. That paradox is based on the fact that the law creates a structure and the structure created the law. The city is still perceived as a disrupted system where there is no order of events and where future advancement cannot find a sustainable relationship with the past.

Urban structure is an everlasting, changeable state, both in a spatial and temporal sense. The state of ongoing changes. It is mostly observed in the present moment. This manner of

observing civil engineering – architectural structures, in a narrower sense, or urban structures in a broader sense, creates problems in analyzing, designing and planning. The past and the future of such a state is the subject of the history of architecture and urban planning (construction as a whole), and new plans and planned projects. Thus, movement and change become hard to notice and even harder to register. It necessarily becomes a research goal since constructors have it in their interest to have insight into the entire flow of construction, change and development.

In contemporary circumstances of constructing cities, it would not solely be the goal of constructors, but also of a string of auxiliary areas that are indirectly or directly involved in urban construction. More precisely, the research goal would be a sample of constructed architectural – urban structure that could be analyzed several times since it would previously, depending on the criteria, be separated from the complete urban complex that is too large for a detailed analysis. Separation, levels of connection and boundaries are of prime importance for having an insight into the contents of urban structure. The quality of data is not the primary goal, since the sample from the content (called urban segment in the paper, but it can be called otherwise) would not evaluate the structure as good or bad, more or less successful and the like, but it would, primarily, serve as a quantitative collection of information that would be processed further in accordance with the needs, resulting in the necessary evaluation.

Evaluation, analysis and collection of data from such a limited section would aid (or would have aided) the final construction of a city as a whole. Connecting segments would open another research level. It would be a so-called conflict between various states, not just with regard to time, but also to the manner of construction, urban legislature, urban economy, styles, forms and aesthetics, etc. A method of such plotting or segmentation would also be a possible and necessary subject and goal of research, or, most probably, its inevitable part. The final product would be the notion of a city as a structure changeable on every level. Two-dimensional and, in the given time period, permanent projections of the constructed urban content would no longer be analyzed or created, not even the three-dimensional representations of the city's appearance with an interrupted ("frozen") conception, but every segment would be timely changeable and usable in real time and in all necessary states.

3. INTERRELATIONSHIPS, IMPACTS, AND REACHES OF URBAN SEGMENTS CONTENTS

The interrelationship, impacts and reaches of the urban segments contents depend on the nature of the situation, but also on the current impacts and future development plans. None of these conditions were given as dominant. The past condition is, in fact, some previously planned condition lagged in the present, the present condition has both of these conditions, as a possible future planned condition which is debatable precisely because it is unknown and unrealized, and which is undoubtedly related to the previous two conditions. What does it mean? The old knowledge cannot be exclusively a museum category left with possessive interventions of revitalization and reconstruction, the current condition cannot be a polygon of rapid interest interventions, and the future situation can not be a list of nice wishes set as a project - and not as a plan! A project that turns into a plan and wants to exist for an extended period of time, and that acts as an unchangeable project/plan, and which also has the support of the institutions that have created it, becomes a frozen condition that threatens planning and urban crisis.

Until now, the circle of urban transformations was closing and the problems were repeating. How to solve the problem which is the problem of impacts and domains of urban content? The urban segment contains enough necessary and unnecessary information (provided that someone wants and knows how to use them) to solve this problem. Architects and urban planners associated with urban design as a specific memory site (Boyer, 1994) believe that this is also supported by the fact that memory affects the "good" or "bad" image that the site provokes. This approach is trying to make subjective existence closer to objective existence of the place. Not only experience and registration of existence. Real-city theoreticians took less into consideration the subjective experience. (Healey, 1997), considering that collaborative planning integrates soft and hard infrastructure through procedures and communication protocols that allow wider participation and representation in the decision-making process.

For example, the comprehensive definition by Laguerre sustainable manner by individual residents and groups of particular city for the purpose of interacting, simulating, explaining, reinforcing, monitoring, neutralizing, criminalizing, expanding (locally or globally), processing, transacting, or undermining any political, social, economic, religious or communicational aspect of the daily activities of the urban community (Laguerre, 2005:1). Obviously, the digitalization creates an expanding sphere of information exchange through which cities and their society observe, control, evaluate and manage their vital systems. At the same time, the emerging software/applications/gadgets/tools represent another driver of progress, providing means for improving general urban performances and environmental quality. Therefore, it is not surprising that the simulation, which has become the evolution of our digitized epoch, has been the focus of attention of many authors, especially during the last two decades (De Waal, 2014).

Due to the multiplication of economic and technological changes, which affect our behavior, needs and mutual interaction, the inherited urban patterns and typologies have been changed. Simulation could not, and still cannot give response to real changes that are important for urban analysis due to a multitude of impacts (Landry, 2005). The basis of the urban city is influenced by several factors: personal quality, will and leadership, human diversity and access to different talents, organizational culture, local identity, urban spaces and objects, networking dynamics. However, the most important among them are political will and appropriate organizational culture, which means that government and other interested parties should recognize the need for a creative city - as a model that stimulates and generates new ideas and approaches. At the same time, the existence of a digital platform, as an interface between interested parties, has already become necessary in the development and exchange of knowledge, especially in the area of climate/ecological awareness. Generally, the first prerequisite for the creation of the creative city can be found in human diversity and access to various talents who foster understanding and learning. A practical approach to such an understanding of the urban segment would be in a scope of real architectural and urban construction.

The contents and impacts that are certainly not linearly registered, would be linked through the urban segment as a theoretical and practical product. Simply, if some architectural-urban impact should exceed from the limitation of its urban environment, it must transfer data relevant to the development of the second segment. Thus, the so-called "urban chaos" would be avoided, and connections between city parts would be better linked.

This is not the formula of the "perfect city", nor it is possible. There was only given a possibility of better connection.

Public spaces are of transitory significance for the realization of this idea. The identity of public spaces is much stronger and more important than the identity of specially isolated spaces. The identity of wider spaces is more complicated and more difficult to understand. A critical overview of the meaning of open public spaces, without wider space, is of great importance for the transformation of the urban process. The identity is capable of recognizing the space as different and suitable in relation to other spaces because of its clear and unique character. (Lynch, 1981). Transition zones are particularly important. They are not just the boundaries between city segments but the most important areas of connection or secession. But, only the operation in locating process, within which the search and selection co-operate with the location, gives the final shape of the site. Truly, if we examine the flow of the locating process from the research through a successful operation until the final form, we could see that every successful operational result finds details and precision of the specification. For example, to establish a locating operation, only certain aspects of the location are given while the form cross-section is not specified. (Manheim, 1980). Architectural and urban product, process of creation and experience of use is a unique entity that requires an integrated approach. The center of our experience are designed events of our existence (Norberg - Schulz, 1971).

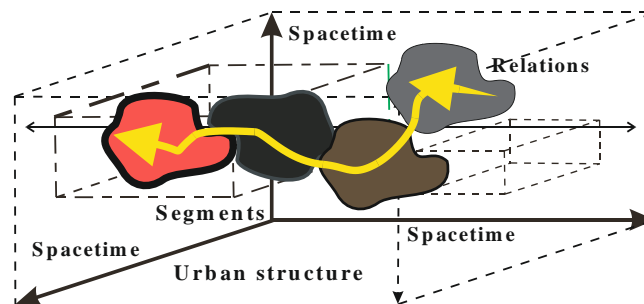


Fig. 1 The quantity and type of information, information transfer, the impact of segment content and the consequence of information effect (source: author)

Integral architecture and urbanism through the segmentation of continuous analysis can create a city that exists as a space without unnecessary divisions. The isolated segment can be analysed to a certain level and when it is exceeded, and the information flows terminated, the data from such a segment becomes less usable and valuable. Establishing a reconnection of the segment with the surroundings it was isolated from, creates problems that are equivalent to a period of isolation. Otherwise, it either becomes the structure for itself or we have to find ways to renew and reconnect its broken connections. Theory and experience do not have to be connected, but they are part of something that can or cannot exist.

The urban structure is, practically, chaotic. Theoretically, it should be regulated. But it is neither one nor the other. Theoreticians of the system accept differences, but they also theoretically and practically solve them. In architecture, urban planning and spatial planning it is only partially accepted. The desire for repetition is theoretically unsustainable. Identical

images in different spaces do not exist-identical images exist through the relationship between their borders, while the lines of delimitation (extension) exist-although the extension of the delimitation (extension) lines could always be different. (Sklar, 1976). The segment which in itself carries enough information, may be determined at many levels of its temporal and spatial structure and it is this flexibility that increases our analysis capabilities, in size, quality and content, especially when they comply with technology which is designed for that purpose and which provides it, as well (Fig. 1).

4. BORDER AREAS OF PARTS OF URBAN STRUCTURE AND RELATIONSHIP OF THEIR CONTENTS

In an urban structure, there are parts that are to a greater or lesser extent intertwined in terms of their content, function, form and other parameters. This immixture has a variety of causes. When it comes to the urban segment (a part of the urban structure that should be characteristic by the recognizable nature, the quantity of urban content), touching or bordering areas are also significant. The majority of urban segments are heterogeneous, multilayered in their content and therefore in their border areas. Only where pre-planning, design, and consistent application of urban legislation has created clear and recognizable units, this heterogeneity is smaller, both within the segments themselves and in their boundary areas. This is not the case in the majority of urban structures. One of the goals of this paper (if not the main goal) is to point to the need for this unnecessary diversity to be as lower as possible and therefore, for urban segments to be more arranged, both in themselves and in their mutual relations.

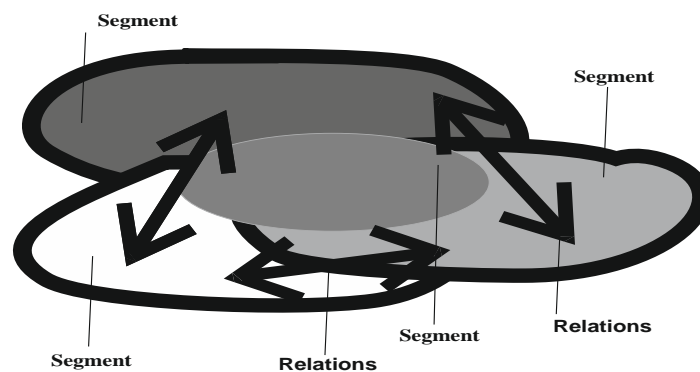


Fig. 2 Position of segments in mutual relation
(source: author)

Since in practice this is unlikely, we only have the analysis of those parts that separate urban segments, provided that each segment is previously defined to the clearest possible extent. There are several reasons why the segments, as well as their border areas, are different, sometimes even over all limits of tolerance. In addition to the aforementioned urban legislation that changes over time, there are also the effects of different styles and rules of construction, economic and social disturbances, changes in social habits, cultural patterns and many more. This is a problem that has been noticed and observed for decades. Lewis

Mumford (1946) and Siegfried Giedion (1948), the leaders of CIAM and famous architectural historians, more than 70 years ago spoke of the idea that a city could be put within the frameworks of its technological advancement, and that the continuing development of human capability could control developmental processes within the environment. They then considered that the construction of an urban and architectural environment, starting from the use of bare hands, through the use of tools, reached its peak by "push the button." Thus, decades ago, they forecast a hyperproductive manner of creating architectural-urban morphology with a potential danger of excluding the human factor.

Exploring the border areas of urban segments, one can observe that those are mostly very narrow and of irregular shape, which is shown in Fig. 2 and Fig. 3. This is the result of a spontaneous and long relationship between architectural and urban activities. However, in some cases, they are of a regular shape (shown in Fig. 4) with clearly distinguished differences between the two types of structure. The example of Fig. 4 shows the relationship between the old and new urban structure created in a short period of time due to the change in urban plans and the overall urban regulation. Both types of urban segmentation are sometimes referred to as "conflict zones" as they create conflicts of architectural and urban structures by many criteria that are very difficult to harmonize and arrange later. Conflicts or interactions between urban and architectural contents have no defined rules and have a set of architectural and urban contradictory parameters. This is where the functional, technical (building), aesthetic and formal levels mix.

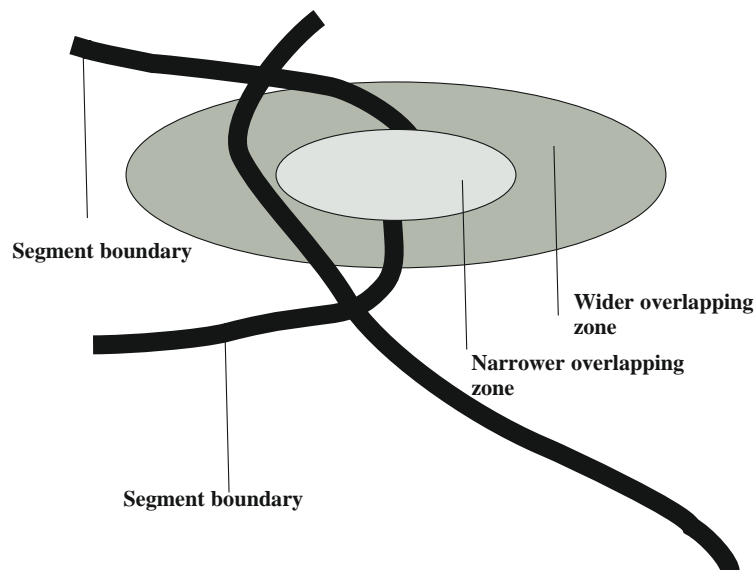


Fig. 3 Segments overlapping zones
(source: author)



Fig. 4 Cartographic display of two segments overlapping in real space (two/dimensional view)
(source: author)

Norberg Schulz (1980) considered this as the spirit of a place (*Genius Loci*) and was interested in changes that can be accomplished by a better conceived and true control of the existing and future space. He first did this at the level of intuition and then at the level of planning, designing, and construction. His view of the conflicts between architectural and urban structure was noticed and successfully analyzed by architects, cultural geographers, sociologists, and philosophers, starting from the fifties to the end of the seventies of the last century. When a city is built in the future, given its anticipated ever-increasing, intertwined, and mixed structure, the segmentation will be an unavoidable approach of methods and techniques, due to the easier viewing of the city's contents and easier data processing.

In order for the key observations to be fully compatible with the approach to such a sensitive topic, the basic principles of building individual parts of the city (segments) as well as their inevitable coexistence and intertwining in time and space must be emphasized. Those would be the following principles:

1. The city is conceived as a whole but is built partially, by parts and in line with the social - economic and economic - financial possibilities;
2. The city, regardless of the manner of its building, in any spatial framework and time period, cannot be treated or even analyzed as an undivided whole;
3. Subparts (segments) are (primarily) technical division, method and approach to the breaking down of the city into those parts prone to analysis that contain characteristic features, regardless of their origin in the past, present, or future;
4. Future interventions in the city and, therefore, in the city segments, should take into account differences of the segments due to which the city is easy to understand;
5. Sudden changes in the nature of the segments, especially their border parts (possible conflict zones) require a special planning, design and construction approach at all possible levels.

From these principles arises the level of construction of a place that, besides the architectural, has a psychological and cultural level. The degree of experiencing the city, places in the city and its continuous repetition is described by Heynen (1999) as obtaining (finding memories and returning own, personal history) that is the essence of living and that can be emotionally attained not only in the existing place but also outside the existing place, anywhere, in the literal sense of the word.

Fig. 5 and Fig. 6 show, in a real three-dimensional space, two selected areas (places) analytically followed in their urban and architectural development over the past ten years in the area of the City of Niš. The same places were previously shown in Fig. 4 with all the necessary markings and notes.



Fig. 5 Visual display of two segments overlapping in real space (three-dimensional view)
(source: author)



Fig. 6 Visual display of two segments overlapping in real space (three-dimensional view)
(source: author)

5. CONCLUSION

Unity of city structure will not be able to reach the level of connectivity in due time, which could allow an optimal interaction. It will not be a utopian level that wants a perfect city and urban structure, system and organization without the wrong needs and results. Even, this will not be the desired level of sustainable development which many people want and try to affirm. The connection of well-built urban segments associated with the appropriate planning strategy, remains a factor of new influence, interventions in urban space and time, and in the end gives their ultimate product. This ultimate product is a good foundation (theoretical and practical) for the patient upgrade of an efficient, all-appropriate urban environment. Generally, the elements that are segment (segments), become a simple and practical process of the analysis of all necessary architectural-urban interventions at all levels. However, this is not easy. Segments, in this paper, theoretically displayed, continuously change the system, structure and organization of urban city life with all its relevant and important connections. These connections can be viewed separately, partly interconnected and extremely interconnected. Only, connections cannot be viewed abstractly, in relation to the necessary, current space and time, and can not allegedly set, plan and change whatever the explanation of this process would be. The way of creating cities has clear definitions. (Lynch, 1960) thought, at the beginning of the sixties, that the future urban emphasis would be in the physical environment as an independent variable.

This study will be used as analysis of physical properties of the identity and structure of mental image. This leads us to a definition that can be called the image's ability. It is the quality of the object with great ability to cause strong images with any observer. That is the form of the color or arrangement that facilitates the creation of clearly recognizable, strongly structured, highly useful mental images of the environment. This can also be called readability or perhaps visibility in an enhanced sense, where objects don't need to be only visible, but presented strongly and intensely in relation to senses. Such thinking is not only an artistic vision and experience of an independent architect or urbanist. It is an analysis of the architectural and urban space that architects and urbanists have left to other sciences and professions.

Urban design is not a game, though it could be? It is the least professional, and the most scientific category, which, as such, must be accepted. (Karminia, 2009) sets the limits until where architects and urban planners can go. Life in public places in the micro scale is faced with various threats of reduction due to the transformation of social values. Our future public places are shaped by trends such as privatization and communication revolution. The integration of urban forms and social values appears as a concern for the development of a modern, urban design that increases the site's safety and promotes further integration. When the connection of the city structure becomes possible then theories will have to change too. Previous theories have failed to change the City.

If the City is a complex structure with its elements, sets, functions and constructions, the results and contribution of every research would be establishing the hierarchy of relations between such contents, with regard to quantity and quality of that which the City (or part of the urban structure) has. Mixing the constructed architectural – urban content is transferrable from a level of a single facility (from one to another), then from narrower or wider constructions, up to the level of the city itself (urban zones) as an extreme. The direct result of such research would be reduced to a necessary limitation that can be analyzed more easily and effectively.

The urban segment with its contents, border relations and analyses, already carries within itself the goal of necessary research that would in the end bring us to the corresponding scientific contribution, where that is necessary and requested. Architects, urban planners and the entire construction field cannot cover this research level individually, but it can be done in cooperation with other, broad or narrow scientific fields. Working on such a research level would offer the exact inclusive possibility that the architectural – civil engineering domain has been missing. The urban segment, or an analysis of a part of architectural, constructed urban structure would be an informational database that would be useful to many. By using, developing and filling out such a (elementary) database in multi-informational systems, the architectural – civil engineering sector and the levels of spatial and urban planning, together with urban and architectural design, would create a future framework in construction for the participation of all other important analyses and information, previously unavailable.

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PRIRODA, KVANTITET I KVALITET URBANIH SEGMENTATA

Gradska struktura nema jasno vidljivih granica između sadržaja, funkcije, forme i ostalog, što je posledica vremensko – prostornog razvoja grada i mnoštva uticaja koji su se u tom procesu povezali. Grad je, ipak stvoren kao proizvod periodične gradnje i svih mogućih intervencija koje su bile u vezi sa takvim jednim tokom razvoja. Planovi, planske aktivnosti, projekti, ciklusi itd. nisu na kraju dali jasan prikaz ukupne strukture grada i nisu ga prikazali kao razgovetnu i svima nama poželjnu celinu. Da bi se takva jedna struktura razumela bilo je i potrebno je preispitivanje svakog posebnog stanja gde bi, zbog složenosti grad trebalo podeliti u odgovarajuće celine i podceline kojima možemo dati različite nazive (element grada, deo grada, strukturalno područje i sl, ali od svih naziva najčešće u upotrebi je pojam i termin segment). Celina grada, da bi mogla biti analizirana, prepoznata i u budućnosti planirana, projektovana i građena mora se oslanjati na takvu podelu. Pojam urbanog segmenta vezan je za prirodu i brojnost elemenata svog sadržaja i on sa takvom svojom kvalitativnom i kvantitativnom prirodom postaje podloga bilo koje dalje analize. Analitički postupak segmenta podrazumeva i jednu dodatnu analizu, njihovih međusobnih dodira ili graničnih područja. Ta područja su važna koliko i segment a neki put i važnija jer u sebi sadrže informacije koje povezuju grad kao celinu i koje su nam potrebne.

Ključne reči: *urbana struktura, segment, uticaj, informacija, granično područje*